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Immigrant Characteristics, the IT Bust, and Their Effect on Entry Earnings of Immigrants

by Garnett Picot and Feng Hou

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Table of contents

Abstract 5

Executive summary 7

1 Introduction 9

2 Declining entry earnings of immigrants to Canada: A literature review 9

3 Data sources and demographic variables 11

4 The changing characteristics of entering immigrants 12

5 Entry earnings trends over the 1991-to-2004 period 15

6 The effect of changing characteristics on rising entry earnings during the 1990s 15

7 Why did entry-level earnings deteriorate from 2000 to 2004? 24

8 Conclusion and discussion 30

Appendix 33

References 41

Symbols

The following standard symbols are used in Statistics Canada publications:

. not available for any reference period
.. not available for a specific reference period
... not applicable
0 true zero or a value rounded to zero
0^ value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
p preliminary
r revised
x suppressed to meet the confidentiality requirements of the *Statistics Act*
E use with caution
F too unreliable to be published

Abstract

Using administrative data, this paper asks (1) whether the changing characteristics of immigrants, notably the rise in the share with university education and in the 'skilled economic' immigrant class, contributed positively to immigrant entry earnings during the 1990s, and (2) whether the entry earnings of immigrants improved after 2000, and if not, why not.

We find that, through the 1990s, the rising number of entering immigrants with university degrees and in the skilled economic class did little to improve earnings at the bottom of the earnings distribution (and reduce low-income rates among entering immigrants), but the changes did increase earnings among immigrants at the middle and top of the earnings distribution. The increasing numbers of highly educated at the bottom of the earnings distribution were unable to convert their education and 'skilled class' designation to higher earnings: they found themselves with low incomes. These outcomes may be related to language, credentialism, education quality, or supply issues, as discussed in the paper.

We find that from 2000 to 2004, the entry earnings of immigrants renewed their slide, but for reasons that differed from the standard explanations of the earlier decline. Much of the fall after 2000 was concentrated among immigrants intending to practice in the information technology (IT) or engineering occupations. This coincided with the IT downturn, which appears to have significantly affected outcomes for these immigrants, particularly the men. Following the significant increase in supply in response to the call for more high-tech workers in the late 1990s, the large numbers of entering immigrants were faced with the IT downturn.

Keywords: immigration, earnings, high tech, immigrants

Executive summary

This paper focuses on the earnings of immigrants during their first few years in Canada. It covers cohorts entering during the 1990s and early 2000s. Earlier research has documented and largely explained a fall in entry earnings among new immigrants over the 1980-to-mid-1990s period. Entry earnings partially recovered during the late 1990s. This later improvement coincided with a significant change in the immigrant selection rules and the characteristics of immigrants—rising education, more immigrants in the skilled workers economic class and in engineering and information technology (IT) occupations—as well as an improvement in the economy. This paper asks to what extent these particular changes in immigrant characteristics, stemming from changes in the selection rules, influenced aggregate entry earnings of new immigrants over the 1990s. The paper also documents a renewed fall in immigrant entry earnings during the early 2000s, and asks why this decline occurred.

The changes to the immigrant selection rules in 1993 were very successfully implemented. The educational attainment of entering immigrants increased dramatically between the early 1990s and 2000, as did the proportion in the 'skilled economic' class. Earlier research showed that these changes in immigrant characteristics had relatively little effect on chronic low income, or the likelihood of entering or exiting low income. The earnings analysis in this paper suggests that changing education and immigrant class characteristics did result in an improvement in **mean entry earnings** over the 1990s, as did an expanding economy.

However, there was significant variation across the earnings distribution in the degree of this improvement. The raw data show that entry earnings gains over the 1990s were much greater among higher paid immigrants than their lower paid counterparts. The research asks specifically to what extent the rising educational attainment and rising shares in the skilled economic class contributed to earnings gains at the bottom and top of the earnings distribution. The results suggest that these changing characteristics resulted in significantly higher entry-earnings during the 1990s among higher paid immigrants, but in little improvement in earnings among their lower paid counterparts, even though the educational attainment of immigrants increased dramatically at both the bottom and top of the distribution.

As noted, this difference in outcomes between the bottom and top of the earnings distribution was not the result of less change in characteristics at the bottom of the earnings distribution. The significant rise in educational attainment and proportion in the skilled economic class over the 1990s was observed across the entire distribution, for both men and women.

To a considerable extent, an increasing number of highly educated entering immigrants were unable to convert their education to higher earnings and hence found themselves at the bottom of the earnings distribution. The relative returns to a bachelor's degree (relative to immigrants with 11 or 12 years of schooling) during the first two full years in Canada was negative among immigrant males at the 15th percentile of the earnings distribution, while they were around 13% for those at the 90th percentile of the distribution. Even over the first 10 years in Canada, relative returns to a bachelor's degree for immigrant males were around 4% among those at the bottom of the distribution, and 20% at the top. Many university-educated entering immigrants found themselves at the bottom of the earnings distribution because of these low returns. Further, the proportion of working-age immigrants at the bottom of the distribution who had university

degrees was increasing, from 24% among the 1991 entering cohort, to 51% for the 2000 entering cohort. Similarly, the skilled economic class designation did not result in any higher earnings than those observed among the family class for immigrants at the bottom of the distribution, although skilled workers at the top earned significantly more than their family class counterparts.

Changes in characteristics during the 1990s induced by the changes in the immigrant selection rules did increase mean earnings and were very effective at improving economic outcomes for those who could take advantage of the higher levels of education and skilled economic class designation. But there were large numbers for whom this did not happen. There are a number of potential reasons for this outcome, as discussed in the conclusion.

But what of the early 2000s? Successive entering immigrant cohorts from 2000 to 2005 experienced declining earnings at entry. The determinants of this fall differed from those identified in the research focusing on the 1980s and early 1990s. It is likely that the declining returns to foreign experience, the shift in the source countries from which immigrants came, and the overall decline in labour market outcomes—three very significant causes of the declines in entry earnings during earlier years—had little to do with the decline after 2000. That is because the returns to foreign experience had already fallen to zero; the change in the source countries of immigrants occurred mainly during the 1970s and 1980s and changed little after 2000; and the labour market for new entrants was not continuing to deteriorate in the late 1990s and early 2000s. Therefore, one has to look elsewhere for possible causes for the decline in entry earnings.

Much of the decline was concentrated among entering immigrants who intended to practice in the IT or engineering occupations. This coincided with the IT downturn, which appears to have significantly affected outcomes for these immigrants, particularly the men. Following the response to the call for more immigrant high-tech workers in the late 1990s, resulting in rapidly increasing supply through immigration, the large numbers of entering immigrants were faced with the IT downturn.

But there were no doubt other factors contributing to the decline in entry earnings after 2000, as some of it remains unaccounted for.

1 Introduction

This paper focuses on the earnings at entry to Canada of successive cohorts of entering immigrants over the 1990s and early 2000s. It asks if the changing characteristics of immigrants contributed positively to improving economic outcomes for immigrants observed during the late 1990s. The paper also asks what role the information technology (IT) downturn during the early 2000s played in the renewed deterioration in economic outcomes for immigrants during that period.

Earlier research documented, and largely explained, declining entry-level earnings throughout the 1980s and early 1990s. Some improvement was observed in the late 1990s, both in this paper and earlier analyses of earnings and low-income rates. This improvement coincided with a significant change in the characteristics of immigrants—rising education, more immigrants in the skilled class and in engineering and IT occupations—as well as an improvement in the economy.

Earlier research also showed that the rising educational attainment of entering immigrants and increasing number in the skilled economic class had relatively little positive effect on chronic low income among immigrants entering during the 1990s, or on the likelihood of entering or exiting low income. But one would have expected these changes in these two characteristics to have positively influenced earnings. The research on low income by necessity focused on outcomes at the bottom of the earnings distribution only. This paper extends that research. It asks what happened to entry earnings across the entire distribution during the 1990s, and why.

The paper then moves to the early 2000s, asking if entry earnings of new immigrants continued to improve over this period, and if not, why not.

2 Declining entry earnings of immigrants to Canada: A literature review

Employment **earnings** of immigrants is the most studied area of immigrant economic integration in Canada. Early findings indicated that newly arrived immigrants have lower earnings than comparable non-immigrant workers, but their initial earnings gap narrows significantly as they adjust to the labour market in the receiving society (Chiswick 1978, Meng 1987). More recent research has suggested that the initial earnings gap may not close as quickly as earlier thought, even among groups entering during the 1970s (Hum and Simpson 2003). Moreover, these gaps increased in the 1980s and 1990s. Subsequent research indicated an emerging trend during the early 1980s of declining earnings among successive waves of immigrants relative to the Canadian born (Bloom and Gunderson 1991, Abbott and Beach 1993). As a result, a number of studies have begun to ask if the decline was associated primarily with recessions or with the changing mix of immigrants by source country, and if this decline abated during the late 1980s (McDonald and Worswick 1998, Baker and Benjamin 1994, Grant 1999).

Some studies conclude that the decline in entry-level earnings of immigrants continued through the early 1990s (Reitz 2001). Research studies using even more recent data observe some improvement during the late 1990s (Green and Worswick 2002, Frenette and Morissette 2003).

Others note that although there has been a large decline in entry-level earnings, the rate of growth in earnings with years in Canada is faster than among earlier cohorts (Li 2003).

Recently, a number of studies have taken a close look at the rise in the earnings gap between recent immigrant cohorts and the Canadian born (Aydemir and Skuterud 2005; Green and Worswick 2002; Ferrer, Green and Riddell 2003; Ferrer and Riddell 2003; Schaafsma and Sweetman 2001; Sweetman 2004). These studies point to issues such as the changing characteristics of entering immigrants, education quality, language skills, credentialism and the returns to years of schooling, declining returns to foreign labour market experience, and a general deterioration in the outcomes for new labour market entrants, of which immigrants form a part. See Picot and Sweetman (2005) for a review of these explanations.

Focusing on low-income rather than earnings, Picot and Hou (2003) conclude that immigrant low-income rates were on a continuous, long-term upward trend over the 1980-to-2000 period (abstracting from business cycle effects). At business cycle peaks, successive entering immigrant cohorts had successively higher low-income rates, even though the educational level of each successive cohort was rising. The rise in low-income rates was widespread, occurring among 'recent' immigrants from all age groups, whether they spoke an official language or not, in all family types, and at all educational levels. The gap in the low-income rate between recent immigrants and the Canadian born was highest among university graduates, particularly those with engineering or applied science degrees. Source region did matter, however: the source regions with the largest increase in the share of the immigrant population (Africa, and South, East and West Asia) also experienced the most rapid increase in low-income rates. Even so, changes in the characteristics of immigrants—language, education, age, source region—accounted for less than half of the overall rise in the low-income rate.

In a later paper, Picot, Hou and Coulombe (2008) found that low-income rates among entering immigrants—those in Canada for five years or less—did not improve after 2000 and, if anything, deteriorated. Low-income rates among entering immigrants were roughly 2.5 times those of the Canadian born through the 1990s, and they rose to around 2.7 to 2.9 from 2000 to 2004. The paper also found that the rise in educational attainment and share in the skilled economic class only marginally improved low-income outcomes during the immigrants' first few years in Canada.

The change in earnings and low-income rates among successive cohorts of entering immigrants over the 1975-to-2000 period is summarized in Table 1.

Table 1
Earnings and low-income rates among selected entering immigrant cohorts relative to the Canadian born

	Relative earnings among men[1] (working full-time, full-year, age 16 to 64)		Relative low-income rates (all ages)	
Immigrant cohorts	1 to 5 years since immigration	6 to 10 years since immigration	1 to 5 years since immigration	6 to 10 years since immigration
	ratio			
1975-to-1979 cohorts	0.84	0.87	1.3	1.2
1980-to-1984 cohorts	...	...	...	...
1985-to-1989 cohorts	0.67	0.72	2.1	1.9
1990-to-1994 cohorts	0.54	0.69	2.6	1.9
1995-to-1999 cohorts	0.60	...	2.4	...

1. Controlling for differences in characteristics between immigrants and the Canadian born.

Source: Statistics Canada, census data from Marc Frenette and René Morissette, 2003, *Will They Ever Converge? Earnings of Immigrant and Canadian-born Workers over the Last Two Decades*, and Garnett Picot and Feng Hou, 2003, *The Rise in Low-income Rates Among Immigrants in Canada*.

3 Data sources and demographic variables

This study uses Statistics Canada's LAD-IMDB database that combines the Longitudinal Administrative Databank (LAD) and the Longitudinal Immigration Database (IMDB). LAD is a random, 20% sample of the T1 Family File, which is a yearly cross-sectional file of all tax-filers and their families. Individuals selected for LAD are linked across years to create a longitudinal profile of each individual. IMDB contains immigrant landing records and annual tax information for all immigrants who have arrived since 1980. LAD-IMDB is produced by matching the two databases, with the result that 20% of all immigrants on IMDB are identified on LAD. The LAD-IMDB allows comparisons of known immigrants and other Canadian tax-filers.

We only include immigrants aged from 20 to 54 at time of entry to Canada. The dependent variable in most models is the natural logarithm of annual earnings. There is a significant amount of information on immigrants at landing from the landing records. In our descriptive tables and multivariate models, we use the following demographic variables of immigrants:

(1) Immigrant cohort, defined as all arriving immigrants who were in Canada for one full income-tax year. Hence, for example, immigrants arriving throughout 1992 would be considered to be in the 1993 cohort, since 1993 was their first full year of earnings. We focus on the 1991-to-2005 entering cohorts.

(2) Years since immigration.

(3) Age at landing, converted to potential labour market experience abroad.

(4) Place of residence in each tax year, grouped into 13 categories: Montréal, Toronto, Vancouver and the 10 provinces (excluding the three aforementioned cities in their respective provinces).

(5) Family structure in each tax year, grouped into four categories: single, lone parents, couples with children, couples without children present.

(6) Self-reported official language ability at landing: speak at least one official language or speak neither official language.

(7) Immigrant class: family, business, skilled class principal applicants, skilled class spouses and dependents, refugees, and other immigrants (backlog, live-in-caregivers and so on).

(8) Education at landing, grouped into five categories: less than 11 years of high school, 11 or 12 years of high school, some postsecondary, bachelor's degree, and master's or doctorate degree.

(9) Intended occupations, grouped into six categories: management; information technology (IT) professionals (including IT professionals, as well as electrical and electronics engineers); engineers (excluding electrical and electronics engineers); other professionals (occupations usually requiring university education or college education, and which are related to natural and applied sciences, health, social science, education, government services and religion, art and culture); sales and services; and other occupations.

(10) Immigrant source regions, grouped into eight categories: United States; Caribbean, Central and South America; Northern, Western and Southern Europe; Eastern Europe; Africa; South Asia; East Asia; other Asian countries; and other countries.

Since the data can only identify immigrants entering Canada since the 1980s, we cannot separate immigrants entering Canada prior to that time from the Canadian born. Hence, the 'comparison group' includes the Canadian born plus immigrants in Canada for 10 years or more. It is well known that immigrants in Canada for longer periods of time more closely resemble the Canadian born regarding their economic outcomes than do more recent immigrants[1]. However, the use of the comparison group is restricted to a few descriptive tables. All models include a sample of immigrants only, and the focus is on their earnings during the first 2 full years in Canada.

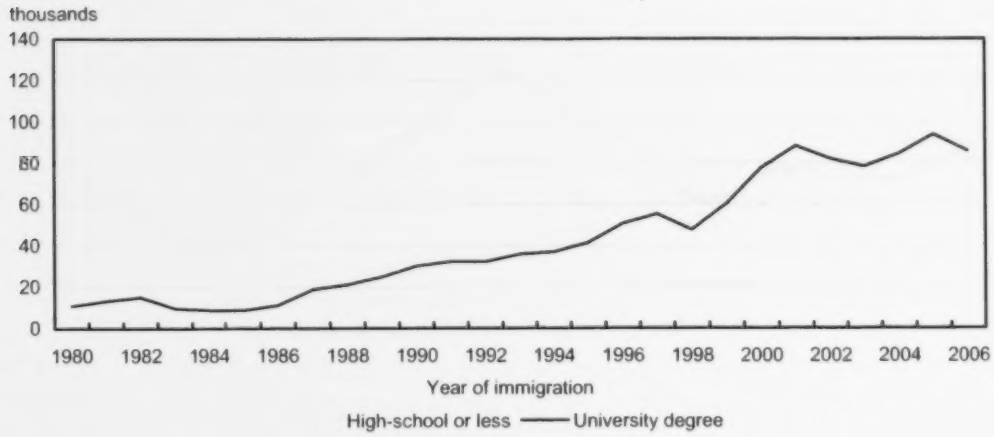
4 The changing characteristics of entering immigrants

The immigrant selection system was altered in 1993 to increase the points for the more highly educated in particular. As well, the priority for economic class immigrants was increased, and emphasis on the family class was reduced. Furthermore, during the information technology (IT) boom of the late 1990s, increased emphasis was placed on selecting IT professionals and engineers.

These initiatives were very successfully implemented. While the overall level of annual immigration remained at around 225,000 over the 1990s, the number of immigrants with university degrees rose from around 10,000 annually in the early 1980s to about 41,000 by 1995, and then it rose dramatically to about 78,000 by 2000, remaining stable after that time (Chart 1). The number in the skilled economic class doubled from 60,000 annually in the late 1980s, to around 120,000 by 2000 and it remained at that level into the early 2000s (Chart 2). For the skilled principal applicants—the group evaluated in the selection points system—the number with 'intended' occupation at the time of entry listed as engineering or IT professions rose from only a couple of thousands through the 1980s, to about 9,000 by 1995, to 25,000 annually by 2000 (Chart 3).

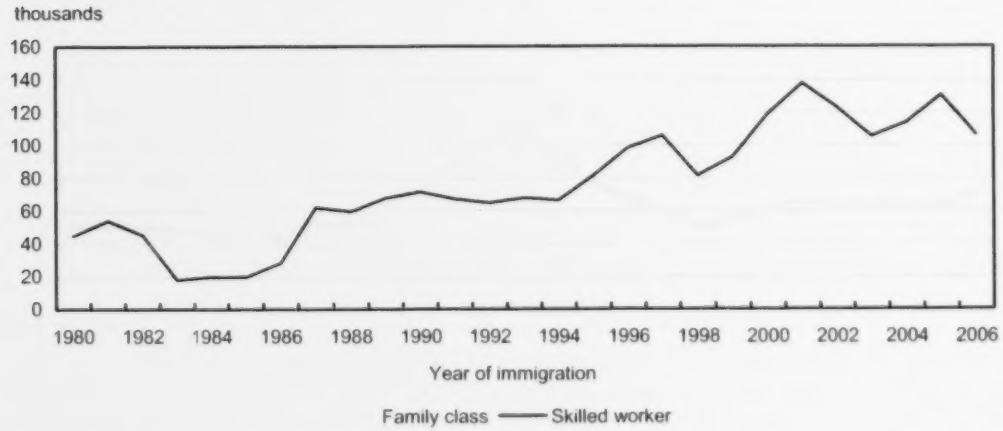
1. In 2000, census data indicate that 83% of the 'comparison group' as defined in this paper were Canadian born. The low-income rate was 13.2% among the Canadian born, 15.2% among immigrants in Canada 10 years or longer (that segment included in the comparison group) and 31.4% among those in Canada less than 10 years.

Chart 1
Number of entering immigrants aged 15 and over, by education level, 1980 to 2006



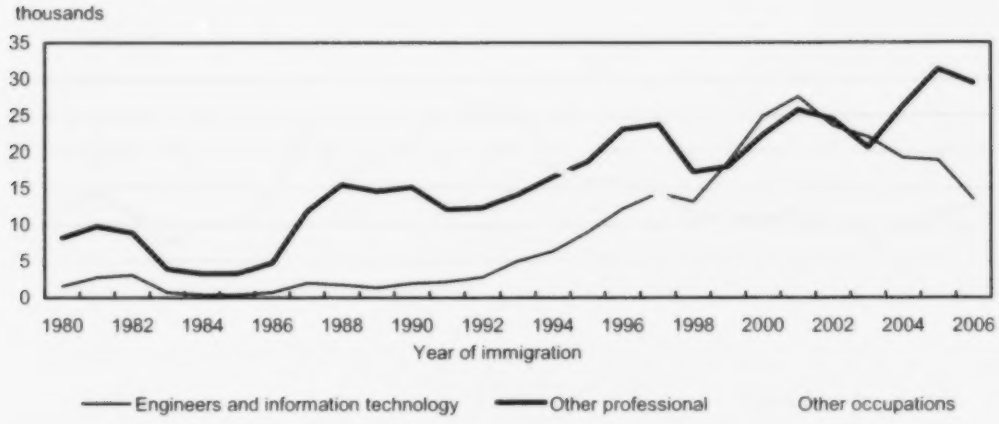
Source: Citizenship and Immigration Canada.

Chart 2
Number of entering immigrants aged 15 and over, by immigrant class, 1980 to 2006



Source: Citizenship and Immigration Canada.

Chart 3
Number of entering immigrants by intended occupation, skilled principal applicants, 1980 to 2006



Source: Citizenship and Immigration Canada.

To provide a benchmark regarding the size of this increase, we turn to census data on immigrants and data on graduates from Canadian universities. These data indicate that, during the early 1990s, the Canadian university system provided more potential labour market entrants in engineering and the IT professions than did immigration, but by 2000 the opposite was the case: immigration had become a larger supplier of new human resources in these fields than the university system.

In 1990, based on the field of study of the highest university degree held by entering immigrants, about 5,500 entering immigrants were engineering graduates, as compared with about 9,700 who graduated from Canadian universities. By 2000, far more engineering graduates were entering Canada through immigration (17,000) than were graduating from the Canadian university system (11,400). A similar story holds true for computer science graduates: by 2000, immigration was providing more computer scientists than was the Canadian university system (Table 2).

Table 2
Number of entering immigrant graduates and graduates from Canadian universities in engineering and computer science, 1990, 1995 and 2000

	1990		1995		2000	
Field of study	Entering immigrant graduates[1]	Canadian university graduates	Entering immigrant graduates	Canadian university graduates	Entering immigrant graduates	Canadian university graduates
	number					
Engineering	5,500	9,700	8,100	10,900	17,000	11,400
Computer science	1,200	2,700	2,000	3,500	6,000	5,100

1. Trends hold at both bachelor's and master's/doctorate levels.
Source: Statistics Canada, census data and special tabulations from the Centre for Education Statistics.

Hawthorne (2006) found that of all persons in Canada trained as IT professionals in 2000, fully 22% had immigrated during the previous five years; the corresponding number for engineering was 20%.

5 Entry earnings trends over the 1991-to-2004 period

Following a significant recovery in the late 1990s, entry-level earnings—defined as average annual earnings during the first two full years in Canada—declined between the 2000 and the 2004 entering cohorts in both relative (to the Canadian born) and real terms (Charts 4 and 5, and Table 3).

One of the advantages of the Longitudinal Administrative Databank is the ability to focus on small groups of entering cohorts. Sample sizes are provided in Table A.1. During their first two full years in Canada, men in the 1991 entering cohort earned 54% of that of the Canadian born of the same age. Little change was observed until the mid-1990s, when this number started to rise. Among the 2000 cohort it had reached 65%, but fell back to around 54% for the 2002-to-2004 cohorts, in spite of the fact that the entering cohorts of the 2000s were much more highly educated than those of the early 1990s. Among the 1992 entering cohort, 26% held degrees; among the 2004 entering cohort it had risen to 61%. Women did not experience the recovery in the late 1990s, but they did register a decline in the 2000s. Earnings at entry were at about 56% of those of the Canadian born up to 1997, and then they fell to 53% among the 2004 entering cohort.

6 The effect of changing characteristics on rising entry earnings during the 1990s

How much of the improvement during the 1990s (among men) was related to changing characteristics, particularly the change in the distribution of the education and skilled class variables? To test this we set up a regression with log annual earnings as the dependent variable. The sample includes immigrants aged 20 to 54 at time of landing who entered Canada since 1980. Earnings during the first 10 years in Canada are included, except for more recent cohorts, where less than ten years' data are available. The independent variables include education, immigrant class, potential foreign work experience[2] and work experience squared, a knowledge of French or English language dummy variable, years since migration, annual cohort, immigrant class, province and city dummy variables, source region, intended occupation, family type, and a detrended regional unemployment rate[3] for prime-aged workers to account for business cycle effects. Cohort and years since migration are interacted to allow different earnings for different cohorts. Individuals with positive earnings in any year are included in the sample. Regressions are run separately for men and women. The regression coefficients are as expected (see Table A.2).

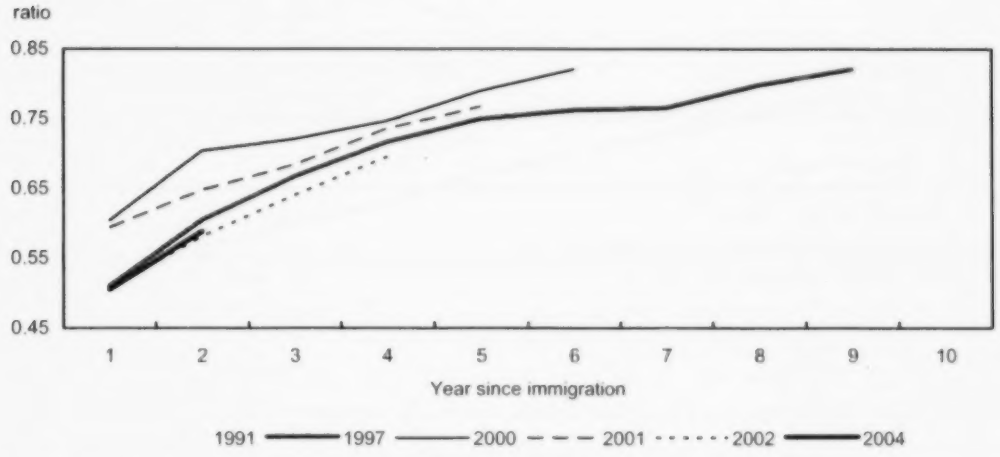
2. Age at landing, minus years of schooling, minus six.
3. This is a detrended annual unemployment rate among men aged 25 to 54. The regional breakdown includes the three largest census metropolitan areas (Toronto, Vancouver and Montréal) as well as provinces (outside the census metropolitan areas).

Table 3
Annual earnings during first two full years in Canada (in 2005 constant dollars)

Entering cohort	Relative earnings	Total annual earnings						
	Immigrants to Canadian born	All immigrants	Skilled principal applicants			Spouses and dependents in the skilled class	Family class	Refugees
			All	Information technology/ engineers	Others			
	ratio	thousands of dollars						
Men								
1991	0.54	23.8	30.9	40.9	29.8	25.1	21.2	17.8
1992	0.52	22.8	32.5	37.2	32.2	24.2	20.2	16.5
1993	0.54	23.5	36.1	37.0	36.1	24.2	20.5	16.7
1994	0.55	24.5	35.4	35.9	35.4	24.2	20.3	15.8
1995	0.55	24.6	33.0	36.9	30.8	22.7	20.2	16.8
1996	0.57	25.3	32.7	36.9	29.8	21.7	21.6	17.6
1997	0.57	25.8	32.5	37.5	28.3	21.7	22.3	17.3
1998	0.60	27.8	33.9	40.7	28.0	22.6	23.2	17.8
1999	0.62	29.3	35.6	40.6	29.5	25.3	24.5	19.5
2000	0.65	31.4	38.1	42.0	33.4	25.7	25.5	19.7
2001	0.62	29.8	34.5	36.5	32.0	24.3	25.4	19.0
2002	0.54	26.1	29.2	28.2	30.0	21.5	23.8	18.2
2003	0.54	25.8	28.6	27.7	29.2	20.6	24.3	18.2
2004	0.54	26.0	28.1	26.5	29.8	20.2	26.9	19.8
Women								
1991	0.61	16.6	25.0	32.4	25.5	15.5	15.3	11.9
1992	0.59	16.5	21.5	32.5	21.6	15.6	14.7	11.6
1993	0.58	16.1	22.3	32.3	22.0	14.6	14.2	11.2
1994	0.56	16.0	23.2	36.4	21.4	15.5	13.8	11.3
1995	0.56	15.8	22.5	31.4	20.8	14.5	13.8	11.9
1996	0.56	15.8	22.3	29.6	20.5	15.0	13.9	10.9
1997	0.56	16.0	21.9	32.8	19.1	14.2	14.8	11.8
1998	0.57	16.7	24.8	37.6	21.5	14.4	14.9	10.9
1999	0.60	18.0	25.9	34.2	21.6	16.5	15.7	11.9
2000	0.59	18.3	28.1	34.8	24.7	16.0	16.2	11.5
2001	0.57	17.8	27.0	29.5	25.6	15.4	14.9	11.4
2002	0.53	16.6	23.3	23.2	23.0	13.9	14.6	12.1
2003	0.51	16.2	21.9	21.5	21.8	14.2	14.2	12.4
2004	0.53	17.1	23.6	21.3	24.1	14.1	15.3	13.5

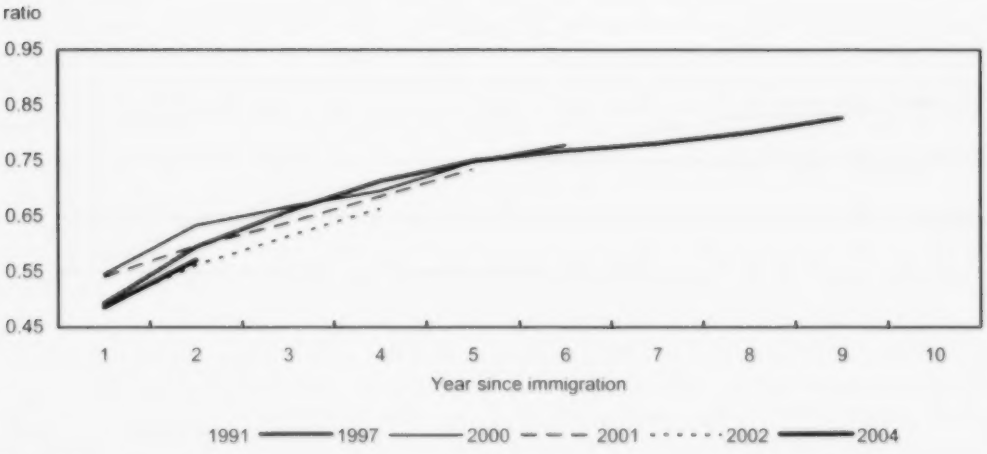
Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

Chart 4
Immigrant annual earnings relative to the Canadian born, raw data, no controls — Men



Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

Chart 5
Immigrant annual earnings relative to the Canadian born, raw data, no controls — Women



Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

To generate the raw data in the first column of Table 4, the model is run with only cohort, years since migration and cohort and years since migration interacted (Model 1, Table A.2). The model is then run controlling only for education and immigrant class (Model 2, Table A.2) to generate the data in the second column of Table 4. Model 3 is run, controlling for all characteristics described above, resulting in the data in the third column of Table 4.

Table 4

Changes in log entry[1] earnings among entering immigrants

	Raw data	Holding education and immigrant class distribution fixed	Holding all immigrant characteristics fixed	Holding all immigrant characteristics fixed and controlling for the unemployment rate	Changes accounted for by changing education and class distribution
			log points		
Men					
1991-to-2000 cohorts	0.27	0.12	0.13	0.03	0.15
2000-to-2004 cohorts	-0.17	-0.16	-0.12	-0.09	-0.01
Women					
1991-to-2000 cohorts	0.00	-0.10	-0.06	-0.10	0.10
2000-to-2004 cohorts	-0.09	-0.11	-0.08	-0.06	0.02

1. Average earnings during first two full years in Canada.

Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

The results suggest that, evaluated at mean earnings, the change in characteristics did substantially improve the entry earnings of immigrants between 1991 and 2000. In the raw data, entry-level earnings for men increased by approximately 27% over this period. Controlling for education and immigrant class—i.e., holding these characteristics fixed—one sees only a 12% increase in entry-level earnings. Hence, the changing characteristics accounted for over one half of the increase, approximately 15 percentage points (27% minus 12%).

Among women, there was no change in entry-level earnings between 1991 and 2000, but holding characteristics fixed, one would have seen a 0.10 decline in the natural logarithm of earnings (roughly a 10% decline in earnings). Hence, the change in characteristics was associated with a 10% increase in entry-level earnings.

Improved economic conditions during the 1991-to-2000 recovery and expansion would also have contributed to the increase in entry earnings. A detrended regional unemployment rate for prime-aged workers was included in the regression to account for improving labour market conditions over the 1991-to-2000 period.[4] When controlling for changing labour market conditions and holding immigrant characteristics fixed (fourth column in Table 4), mean entry earnings are seen to improve 3% for men, and to decline 10% for women over the period. These results suggest that of the 27% increase in mean entry earnings over the 1991-to-2000 period, changing characteristics accounted for perhaps 14 percentage points (27 – 13) and increasing economic conditions accounted for a further 10 percentage points (13 – 3). Among women, changing characteristics are seen to improve earnings by 6 percentage points (0 – [-6]), and improving economic conditions by 4 percentage points (-6 – [-10]).

These results are significantly different than those reported in the earlier literature, where changing characteristics produced little change in the likelihood of entering or exiting low income, or of being in chronic low income.

4. The detrended unemployment rates were based on annual unemployment rates among men aged from 25 to 54 in the three largest metropolitan areas or provinces.

There may be a couple of reasons for the differing findings. First, low-income data are based on family income, and the earnings data are for individuals. It may be that events occurred to other family members that affected low-income entry and exit rates. Second, and likely more important, the earnings changes are evaluated at the mean value, and the low-income data focus on individuals at the bottom of the income distribution. It may be that the effect of the change in characteristics varies across the income distribution, with the rising educational levels and the shift toward more skilled class immigrants having more positive effects on the earnings of people at the top of the distribution, for two reasons.

First, the more highly educated and the skilled class do tend to earn more than the less educated and family class; more highly educated immigrants entering Canada may be more likely to find themselves at the top of the income distribution. Second, the returns to higher levels of education (e.g. the earnings advantage of a degree over high school graduation) will be greater among immigrants at the top of the income distribution. Immigrants with higher levels of education who find themselves at the bottom of the income distribution are likely there because they are not receiving the same kinds of returns to that education for whatever reason—related to the quality of their education, language issues, field of study, or possibly other unobserved characteristics.

It may be, then, that the increase in the level of education among immigrants and in the number of immigrants in the skilled workers class significantly affected outcomes at the top of the income distribution, but did little to increase earnings among those at the bottom and, therefore, did little to reduce low-income rates among immigrants.

To determine if this is the case, we turn to a procedure that appropriately re-weights the sample. This technique was developed by DiNardo, Fortin and Lemieux (DFL, 1996). The DFL procedure can be used to calculate the hypothetic, or counterfactual, earnings distribution that would have been observed in 2000 had the distribution of education and immigrant class that existed in 1991 been in place in 2000.[5] One can then compare this hypothetical earnings distribution for 2000 with the actual earnings distribution in 2000. The hypothetical distribution essentially holds the education and immigrant class characteristics fixed from 1991 to 2000. Therefore, the difference between the actual and hypothetical earnings distributions is associated with the change in these characteristics between the two years.

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5. To produce the hypothetical (i.e., counterfactual) distribution for 2000 holding the educational and immigrant class distributions fixed at the 1991 level, a new weight is calculated for each observation in the 2000 sample of recent immigrants. The weight for each observation is the ratio of the probability (for each observation) of being in the 1991 sample to the probability of being in the 2000 sample, conditional on the observed level of education and immigrant class. These probabilities (e.g., the probability of being in the 1991 or 2000 sample) are estimated using a logistic regression based on the pooled sample of all recent immigrants in 1991 and 2000. This exercise is carried out twice, once holding the education and immigrant class distributions fixed over the 1991-to-2000 period, and once holding all immigrant characteristics fixed (including language, source region, potential work experience, etc.). The results are reported in Table 5.

   As with all decomposition techniques, it is necessary to select a 'base' year and hold the composition constant at the levels observed in that base year. In Table 5, 1991 was selected as the base year, and a hypothetical earnings distribution produced for 2000 holding education and immigrant class distributions fixed at the 1991 level. If one selects 2000 as the base year and produces a hypothetical earnings distribution for 1991 holding immigrant class and education fixed at the 2000 level, the results are somewhat different, but the main findings hold. The increase in earnings associated with the changing characteristics are much greater at the top of the earnings distribution than at the bottom. The results are reported in Table A.5 (Appendix A).

This procedure is analogous to other, more commonly used decomposition or standardization techniques, except that such techniques typically provide estimates of hypothetical and actual values at the mean only. This approach allows one to produce hypothetical (counterfactual) distributions, not just mean values. Rather than generating and plotting the entire distributions, we have chosen to produce hypothetical and actual earnings estimates at the 15th, 50th and 90th percentiles of the earnings distribution. The results are presented in Table 5.

Table 5

Changes in log entry earnings[1] at various points in the earnings distribution

	Raw data	Holding education and immigrant class distribution fixed	Holding all immigrant characteristics fixed	Changes accounted for by	
				Changing education and class distribution	Change in all immigrant characteristics
			log points		
Men					
1991 cohort to 2000 cohort					
At 15th percentile	0.16	0.16	0.14	0.00	0.02
At 50th percentile	0.23	0.13	0.13	0.10	0.10
At 90th percentile	0.36	0.11	0.06	0.24	0.30
2000 cohort to 2004 cohort					
At 15th percentile	-0.17	-0.18	-0.13	0.01	-0.04
At 50th percentile	-0.17	-0.18	-0.16	0.03	-0.01
At 90th percentile	-0.28	-0.27	-0.26	0.01	-0.02
Women					
1991 cohort to 2000 cohort					
At 15th percentile	-0.14	-0.15	-0.09	0.01	-0.06
At 50th percentile	0.02	-0.07	-0.02	0.08	0.03
At 90th percentile	0.18	-0.02	-0.02	0.20	0.20
2000 cohort to 2004 cohort					
At 15th percentile	-0.11	-0.15	-0.09	-0.04	-0.02
At 50th percentile	-0.12	-0.15	-0.13	0.03	0.01
At 90th percentile	-0.08	-0.08	-0.08	0.00	0.00

1. Earnings during first two full years in Canada.

Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

For men, at the 15th percentile, entry earnings rose 16% from 1991 to 2000. If one holds the education and immigrant class distributions fixed from 1991 to 2000, earnings are still seen to rise 16%. Therefore, the change in these characteristics resulted in a 0-percentage-point increase in entry earnings (16 minus 16). Doing similar calculations at the 50th and 90th percentiles, we find that at the 50th percentile there was a 10-percentage-point increase in earnings associated with the changing characteristics during the 1990s, but at the top of the earnings distribution (the 90th percentile) this increase is 24 percentage points. During the 1990s, the rise in education and the shift to the skilled class had much more effect on earnings at the top of the earnings

distribution, but they did little to reduce low-income rates, as noted earlier. Similar results are observed for women, where the effect of changing education and immigrant class increased earnings by only 1% at the bottom of the distribution and 20% at the top.

To determine why changing education and immigrant class characteristics had a larger effect on earnings at the top of the distribution, we first focus on the education variable. Changing education characteristics may have had more effect at the top of the distribution, because it is here that one finds the more highly educated skilled class immigrants, and changes in these distributions may be concentrated at the top.

But this was not the case. The rise in educational attainment among immigrants during the 1990s was seen across the entire entry-earnings distribution, not just at the top. For example, the share of entering male immigrants with a university degree (bachelor's, master's or doctorate) rose 31 percentage points from 1991 to 2000 in the bottom of the earnings distribution and 36 percentage points at the top (Table 6).

Table 6

Distribution of entering immigrants by education, 1991, 2000 and 2004, by earnings[1] quartile

	Distribution			Change in distribution	
	1991	2000	2004	1991 to 2000	2000 to 2004
			percent		
Men					
Bottom quartile					
Bachelor's degree	18	40	45	22	5
Master's and doctorate degrees	6	15	15	9	0
2nd quartile					
Bachelor's degree	17	36	39	19	3
Master's and doctorate degrees	6	12	15	6	3
3rd quartile					
Bachelor's degree	16	37	42	21	5
Master's and doctorate degrees	5	14	12	9	-2
Top quartile					
Bachelor's degree	25	48	47	23	-1
Master's and doctorate degrees	14	27	21	13	-6
Women					
Bottom quartile					
Bachelor's degree	16	34	41	19	6
Master's and doctorate degrees	3	7	10	4	3
2nd quartile					
Bachelor's degree	15	33	36	17	3
Master's and doctorate degrees	2	7	10	5	3
3rd quartile					
Bachelor's degree	17	35	39	18	4
Master's and doctorate degrees	3	7	9	4	2
Top quartile					
Bachelor's degree	26	48	50	22	2
Master's and doctorate degrees	6	18	17	12	-1

1. Based on earnings during first two years in Canada.

Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

Among women, the educational attainment of those in both the bottom and top did increase significantly. The proportion of entering immigrants with university degrees rose 23 percentage points between the 1991 and the 2000 entering cohorts among those in the bottom quarter of the earnings distribution and 34 percentage points in the top quarter.

These results are consistent with earlier observations that the educational attainment of immigrants in chronic low income rose dramatically over the 1990s (Picot, Hou and Coulombe 2008). Among the 1993 entering cohort, of those in chronic low income some 13% had degrees; among the 2000 entering cohort, this rose to 41%. Over half of the entering immigrants in chronic low income were in the skilled economic class in the 2000 cohort.

Since the rise in educational levels is observed across the entire earnings distribution, this is not a plausible explanation as to why the changing characteristics resulted in greater earnings gains at the top than at the bottom of the distribution.

The answer lies in the differences in the relative returns to a university degree. To demonstrate this effect, we ran quantile regressions at 15th, 50th and 90th percentiles. The dependent variable is the natural log earnings. The independent variables are identical to those employed in the mean value regression reported above,[6] except that the unemployment rate is excluded (Table A.2). The coefficients are available on request. Models were run separately for men and women, based on pooled data for the 1991-to-2004 entering cohorts. Regressions were run on two separate populations, those in Canada for 2 years or less, and those on Canada for 10 years or less.

The coefficient on the bachelor's degree variable estimates the percentage difference in earnings between bachelor's degree holders and entering immigrants with 11 or 12 years of schooling. Generally speaking, this university wage premium is much greater at the 90th than 15th percentile (Table 7). In fact, during the first 2 years in Canada, male bachelor's degree holders at the 15th percentile earned 9.7% less than their less educated counterparts, although over the first 10 years in Canada they earned marginally more (3.7%).[7] But at the 90th percentile, this bachelors degree wage premium was 13% during the first 2 years in Canada, and 20% or more over the first decade. The story is similar for entering immigrants with master's/doctorate degrees, except that the wage premium is greater, as one would expect. But the differential between the bottom and top of the distribution is observed: over the first 10 years the wage premium is 39% at the 90th percentile, and 10% at the 15th. A similar pattern holds for women, except that the wage premium is higher everywhere for immigrant women than men, just as it is among the Canadian born.

The story regarding the effect of immigrant class on earnings growth for men is similar to that for the education variable. Over the 1990s, there was a significant increase in the share of male

6. The independent variables include cohort, years since migration, years since migration interacted with cohort, education, immigrant class, family status, province or census metropolitan area, source region and intended occupation.
7. Note that education refers to the level at entry to Canada, and is not updated with years spent in Canada. Hence, the estimated returns over the first decade do not precisely refer to returns to, say, a bachelor's degree, because some portion (likely small) of the sample may have acquired a higher level of education during the first decade in Canada. But we are interested in the effect on earnings during the first few years in Canada of altering the educational attainment of immigrants **at entry**. Hence, this is the appropriate measure of education for our purposes.

immigrants who were skilled class principal applicants both at the bottom and top of the earnings distribution (Tables A.3 and A.4) just as there was for education. But the earnings advantage of being a skilled class male principal applicant was much less for those who found themselves at the bottom of the distribution than for those at the top. During the first two years in Canada, skilled class principal applicants earned 7% more than the family class at the 15th percentile; at the 90th percentile they earned 19% more. Among women the story was reversed, the earnings advantage of being skilled class female principal applicants was larger at the bottom of the earnings distribution than at the top. However, among women the higher return to skilled class principal applicants at the bottom was probably offset by the much smaller increase in the share of skilled class principal applicants than at the top.

Table 7
The effect of education and immigrant class or annual earnings at the bottom, middle and top of the immigrant earnings distribution

	Difference in annual earnings		
	15th percentile	50th percentile	90th percentile
	percent		
Education			
Difference between immigrants with a bachelor's degree and 11 to 12 years of schooling at entry			
Male – during first 2 years in Canada	-9.7	1.7	13.2
Male – during first 10 years in Canada	3.7	11.8	20.2
Female – during first 2 years in Canada	0.9	11.7	21.1
Female – during first 10 years in Canada	13.7	21.1	27.3
Difference between immigrants with a master's or doctorate degree and those with 11 to 12 years of schooling at entry			
Male – during first 2 years in Canada	-5.4	15.1	34.6
Male – during first 10 years in Canada	9.6	25.8	39.2
Female – during first 2 years in Canada	9.6	25.8	39.2
Female – during first 10 years in Canada	24.2	38.3	45.2
Immigrant class			
Difference between immigrants in the skilled economic class and those in the family class			
Male – during first 2 years in Canada	7.2	13.7	19.4
Male – during first 10 years in Canada	1.1	10.2	16.4
Female – during first 2 years in Canada	31.0	25.3	15.9
Female – during first 10 years in Canada	24.8	19.1	12.7

Note: Results are based on quintile regression coefficients with dependent variable ln (annual earnings) and independent variables identical to those reported in Appendix Table A.2.
Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

To summarize, during the 1990s the changes in education and immigrant class characteristics were associated with a significant improvement in **average** earnings outcomes, and notably with improved outcomes at the top of the distribution. But an increasing share of these highly educated skilled class immigrants found themselves at the bottom of the earnings distribution because they were unable to convert these characteristics to higher earnings during the first

2 years, and even during the first 10 years in Canada. As a result, the change in characteristics did little to improve earnings at the bottom of the distribution, or outcomes related to low-income rates.

7 Why did entry-level earnings deteriorate from 2000 to 2004?

Given the partial recovery in entry-level earnings during the late 1990s, the new 'labour-market friendly' characteristics of immigrants and the continued strong economic growth over the 2000-to-2004 period,[8] why did the trend not continue?

First, the effects of changing characteristics on earnings over the 2000-to-2004 period were very small at all points in the distribution evaluated (Tables 4 and 5). This is likely because the standard background characteristics changed little over this period.

What of the standard explanations for the entry earnings decline of the 1980s and 1990s? They include declining returns to foreign experience, changing source regions and the associated factors—language, culture, school quality, discrimination—and the deterioration outcomes for new labour market entrants in general. These factors accounted for virtually the entire decline over earlier periods (Aydemir and Skuterud 2005).

However, it is unlikely that the earlier explanations will account for much of the decline in the early 2000s. The returns to foreign experience had gone to zero by the late 1990s, and hence this variable is unlikely to have had little to contribute with regard to the decline. In the regressions reported in Table A.1, returns to 'potential' foreign work experience were virtually zero (or slightly negative). Hence, this is an unlikely explanation.

With regard to the deterioration in labour market outcomes for labour market entrants as a whole, with immigrants being a special case, Green and Worswick (2002) found that this was very important during the 1980s, but that it accounted for little of the observed decline in the 1990s. Furthermore, the outcomes for young labour market entrants—particularly males, where the decline was largely observed—had stopped deteriorating during the late 1990s and early 2000s (Morissette 2008).

Finally, the major change in the source region distribution occurred from the 1960s to the 1980s; there have been relatively few changes since that time, certainly not during the early 2000s. Table 8 shows that, from 2000 to 2004, the distribution by source region of entering immigrants changed little.

8. Annual gross domestic product growth was an average 2.7%.

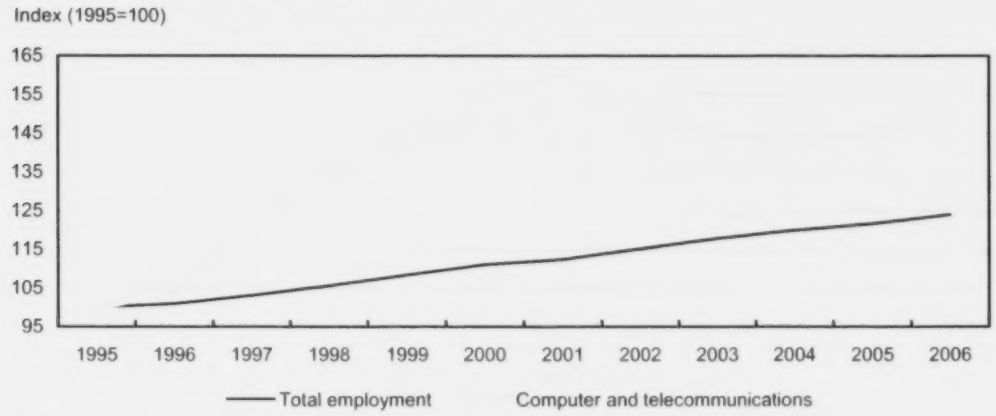
Table 8
Distribution of entering immigrants by major source region

Major source region	1991	1997	2000	2004	2005
			percent		
United Kingdom	4.2	2.6	2.4	2.5	2.7
Other Europe	20.0	15.1	18.1	14.5	15.1
United States	2.8	2.6	2.9	2.7	3.2
Caribbean, Central and South America	13.2	8.3	8.0	9.2	9.4
Asia	52.2	63.9	59.5	60.0	57.5
Africa	6.3	6.6	8.3	10.2	11.2
Others	1.2	0.9	0.6	0.9	0.8

Source: Statistics Canada, CAMSIM table 051-0006.

Given the very large increase in the number of entering immigrants in the information technology (IT) and engineering professions over the late 1990s, and the continuing large numbers—though declining—in the early 2000s, the IT downturn may have played a significant role in the deterioration of entry-level earnings. Employment growth in the Canadian economy has been very robust since the late 1990s. Chart 6 indicates that employment grew by 12% from 1995 to 2000 and another 7% from 2000 to 2004, the period of interest to us. In the computer and telecommunication sector,[9] however, employment gained 60% from 1995 to 2001 and declined 12% by 2004, followed by some recovery.

Chart 6
Employment growth, Canada, 1995 to 2006

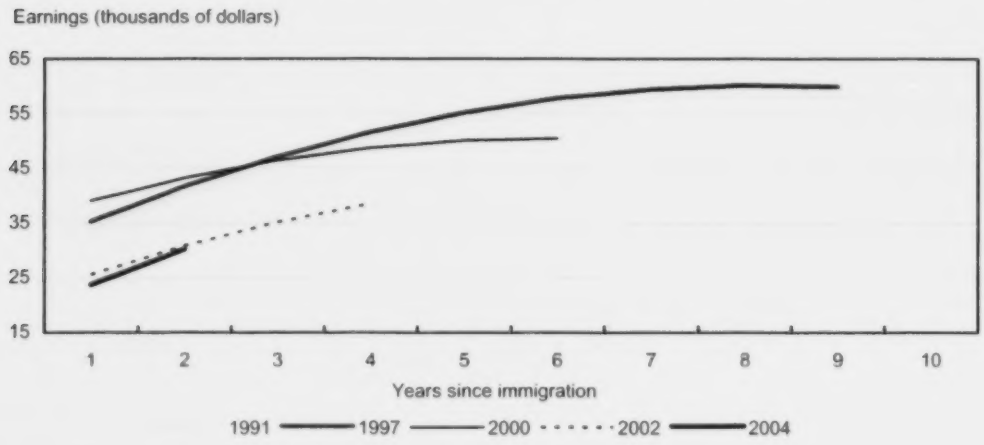


Source: Statistics Canada, CANSIM and special tabulations from the Labour Statistics Division.

We find that the decline in immigrant entry earnings was concentrated among skilled principal applicants that work in IT and engineering professions (Charts 7 to 12 and Table 9). Among men in these occupations, entry-level earnings fell by 37% between the 2000 and the 2004 entering cohorts; other groups registered some decline, but much less. Among skilled principal applicants with other intended occupations (other than IT and engineering professions) and the spouses of skilled principal applicants, earnings fell around 11%; among the family class, they changed little. Similar differences were observed among women.

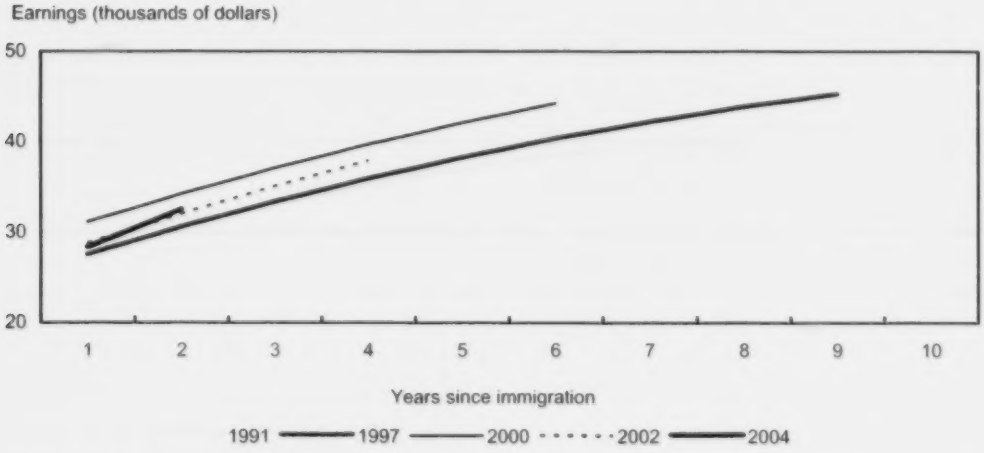
9. Includes manufacturing industries related to computer and communications equipment and service industries related to computer and communications (Bowlby and Langlois 2002).

Chart 7
Annual earnings for selected entering immigrant cohorts by years since immigration, 1991 to 2004 — Men, information technology and engineering



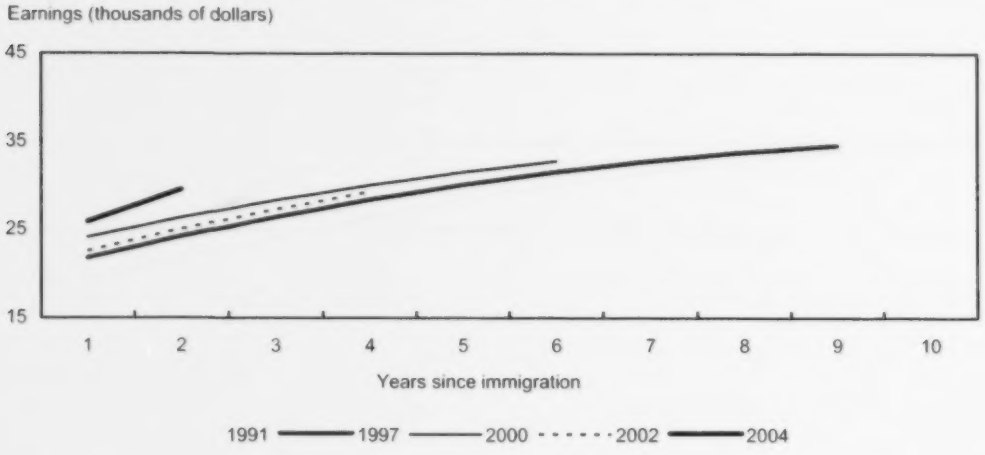
Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

Chart 8
Annual earnings for selected entering immigrant cohorts by years since immigration, 1991 to 2004 — Men, other skilled principal applicants (no information technology and engineering)



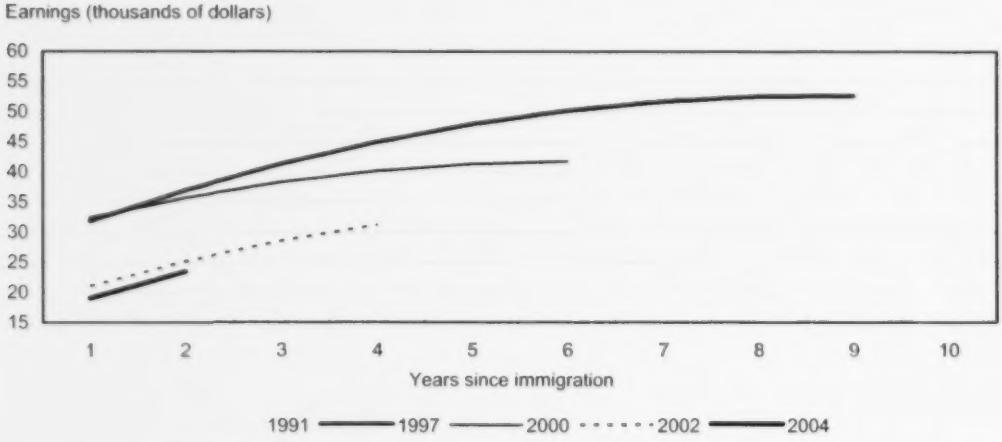
Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

Chart 9
Annual earnings for selected entering immigrant cohorts by years since immigration, 1991 to 2004 — Men, family class



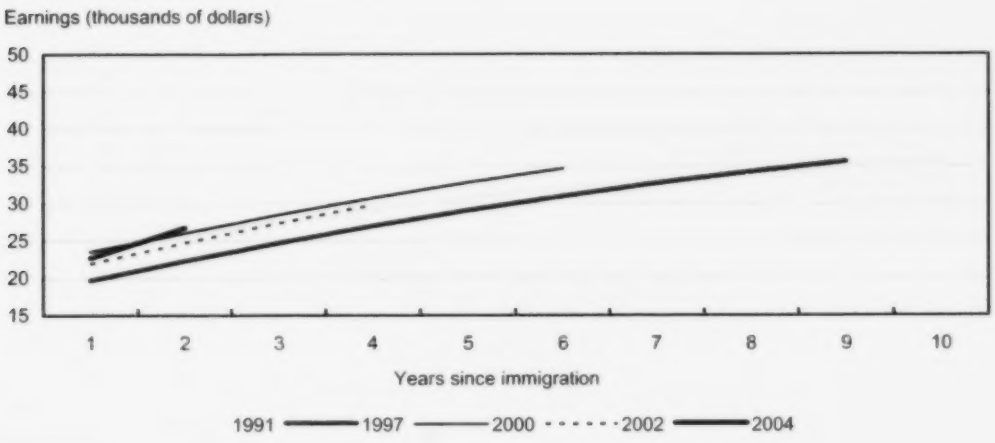
Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

Chart 10
Annual earnings for selected entering immigrant cohorts by years since immigration, 1991 to 2004 — Women, information technology and engineering



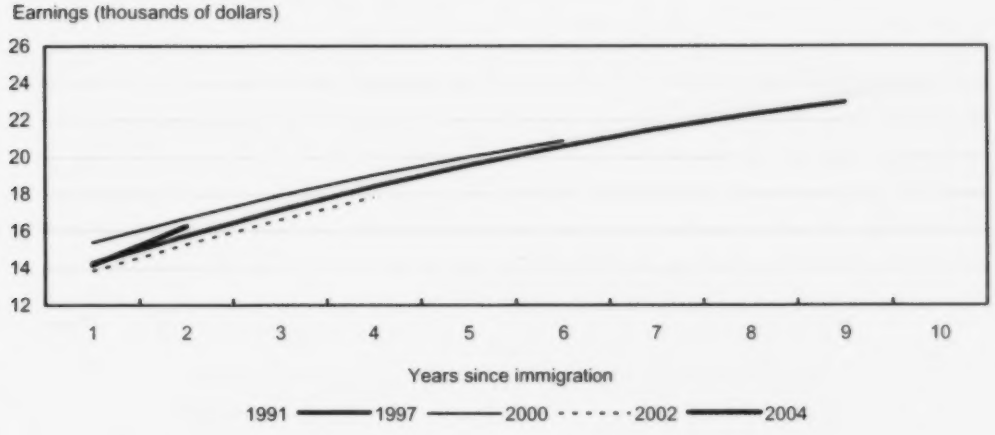
Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

Chart 11
Annual earnings for selected entering immigrant cohorts by years since immigration, 1991 to 2004 — Women, other skilled principal applicants (no information technology and engineering)



Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

Chart 12
Annual earnings for selected entering immigrant cohorts by years since immigration, 1991 to 2004 — Women, family class



Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

A simple way of assessing the extent to which the decline from 2000 to 2004 was concentrated among the skilled class, particularly those whose intended occupation was IT or engineering, is to simply exclude them from any calculations, and then assess the effect.

For entering male immigrants as a whole, entry earnings fell 17% between the 2000 and the 2004 entering cohorts. But if one excludes immigrants whose intended occupation at entry was IT or engineering, the decline falls to 4% (Table 9). After including controls to account for cross-cohort differences in characteristics, the earnings decline for all male entering immigrants is 12%, but with IT workers and engineers (intended occupation) removed, this falls to 2%. Hence, among men, much of the decline was concentrated among skilled principal applicants whose intended occupation was IT or engineering.

For women, about half of the decline in earnings from 2000 to 2004 is accounted for by excluding IT professionals and engineers. Therefore, overall, with men and women combined, the earnings decline (with controls) is 10% for all immigrants, and 4% with IT workers and engineers excluded. About two thirds of the overall decline appear to be attributed to what happened to these particular immigrants.

Table 9
Change in log entry earnings between entering immigrants in 2000 and 2004

	Raw data	With controls
	percent	
Men		
All immigrants	-17	-12
No information technology/engineering (skilled)	-4	-2
Women		
All immigrants	-9	-8
No information technology/engineering (skilled)	-5	-4
Both Men and women		
All immigrants	-15	-10
No information technology/engineering (skilled)	-5	-4

Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

Since virtually all IT professionals and engineers hold a university degree, and earnings for this group of entering immigrants declined after 2000, the value of a degree for this group obviously declined. It declined to a lesser extent for 'other' skilled principal applicants and rose among the family class (Table 10). Hence, one cannot talk in general terms about the declining outcomes for the university educated after 2000, it depends upon which immigrant class one is in.

Table 10

Estimated annual earnings[1] of bachelor's and master's/doctorate graduates during their first two full years in Canada, various entering cohorts

	First two years in Canada		Four to five years in Canada	
	Bachelor's	Master's/ doctorate	Bachelor's	Master's/ doctorate
	thousands of dollars			
Men				
Information technology/engineers				
1991-to-1992 cohorts	36.9	44.6	51.4	61.6
2000-to-2001 cohorts	36.4	44.9	45.6	52.9
2003-to-2004 cohorts	29.7	32.8	...	...
Other skilled principal applicants				
1991-to-1992 cohorts	35.4	40.9	43.0	52.8
2000-to-2001 cohorts	31.0	33.7	40.4	43.4
2003-to-2004 cohorts	30.0	34.3	...	...
Family class				
1991-to-1992 cohorts	23.0	26.8	30.1	37.7
2000-to-2001 cohorts	25.3	37.2	33.7	45.5
2003-to-2004 cohorts	25.8	36.5	...	...
Women				
Information technology/engineers				
1991-to-1992 cohorts				
2000-to-2001 cohorts	29.1	38.2	37.7	45.4
2003-to-2004 cohorts	23.6	27.5	...	...
Other skilled principal applicants				
1991-to-1992 cohorts	25.5	34.1	33.2	42.9
2000-to-2001 cohorts	23.3	25.6	31.6	36.0
2003-to-2004 cohorts	22.6	26.2	...	...
Family class				
1991-to-1992 cohorts	17.3	20.1	23.4	29.1
2000-to-2001 cohorts	16.3	23.8	24.2	29.5
2003-to-2004 cohorts	16.0	18.7	...	...

1. Controlling for cross-cohort differences in characteristics and unemployment rates.

Note: Cells for the women's 1991-to-1992 information technology/engineers cohorts are left blank because the sample size was too small.

Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

8 Conclusion and discussion

Research has documented, and largely explained, declining entry-level earnings throughout the 1980s and early 1990s among successive cohorts of entering immigrants. Some improvement was observed in the late 1990s, both in this paper and earlier studies of earnings and of low-income rates. This improvement coincided with a significant change in the characteristics of immigrants—rising education, more immigrants in the skilled class and in engineering and information technology (IT) occupations—which in turn was related to changes to the immigrant selection system. Economic growth was also substantial during the late 1990s, potentially accounting for some of the improvement in earnings.

Earlier research showed that the changes in immigrant characteristics had relatively little effect on chronic low income or the likelihood of entering or exiting low income. The earnings-based analysis in this paper concludes that changing education and immigrant class characteristics did result in some improvement in entry earnings over the 1990s, as did improving labour market conditions. However, during the 1990s, the entry-earnings gains among successive entering cohorts were much greater among higher rather than lower paid entering immigrants, even though the educational attainment of both high- and low-paid immigrants increased significantly. An increasing share of the highly educated, economic-class entering immigrants found themselves at the bottom of the earnings distribution because they were unable to convert these characteristics to higher earnings levels. This was certainly true during the first two years in Canada, and even over the first decade. As a result, these changing characteristics had only a small effect on earnings at the bottom of the distribution and on low-income outcomes. But the face of chronic low-income changed significantly: the share of immigrants in chronic low income—in low income at least four of the first five years—with a university degree rose from 12% among the 1993 entering cohort to 41% in the 2000 entering cohort, and in this latter cohort over half of the immigrants in chronic low income (51%) were in the skilled class (Picot, Hou and Coulombe 2008).

Why did increasing numbers of entering immigrants experience very low relative returns to their university education during the 1990s and find themselves at the bottom of the earnings distribution? Possible reasons might include:

(1) the inability of the labour market to absorb such a large increase in the supply of the highly educated, resulting in downward pressure on relative wages;
(2) 'credentialism' issues related to the recognition of foreign degrees;
(3) potentially lesser quality education—relative to North American higher education—held by many entering immigrants from the non-traditional source regions; and
(4) possible language issues that prevented the higher education held by many new immigrants from having the expected positive effect on earnings.

There is some evidence to support this last view. In a recent paper, Bonikowska, Green and Riddell (2008) observed that immigrants have lower levels of literacy in French or English (the most common languages of work in Canada) than do the Canadian born. Furthermore, they found that the returns to any given level of literacy were no lower among immigrants than among the Canadian born. These results were observed for all levels of education. Viewed at a point in time, these results suggest that half or more of the gap in earnings between immigrants and the Canadian born could be accounted for by differences in literacy skills in English or French. Such literacy skills could have both a cognitive and language component.

Another recent paper by Chiswick and Miller (2002) found that in the United States, immigrants earned 7% more for each additional year of education if they were fluent in English, but only 1% more if they were not. In other words, in the absence of English language fluency, additional education provided little in the way of additional earnings over a less educated immigrant. It may be that language issues were preventing immigrants from taking advantage of the earning potential of their higher degrees. As noted above, there are other possible reasons.

After 2000, the deterioration in entry level earnings observed over the 1980-to-mid-1990s period returned, only for very different reasons. The principal determinants of the earlier decline, namely lower returns to foreign experience, the shift in the source countries from which immigrants come, and the overall decline in labour market outcomes, likely had little to do with the decline after 2000. This is because the returns to foreign experience had already fallen to zero and would have to become significantly negative in order to have had any effect; the change in the source counties of immigrants occurred mainly during the 1970s and 1980s, and changed little after 2000; and the labour market for new entrants was not continuing to deteriorate in the late 1990s and early 2000s. Therefore, one has to look elsewhere for possible causes for the decline in entry earnings after 2000.

Much of the decline was concentrated among entering immigrants who intended to practice in the IT or engineering occupations. This coincided with the IT downturn, which appears to have significantly affected outcomes for these immigrants, particularly the men. Following the response to the call for more high-tech workers in the late 1990s, resulting in a rapidly increasing supply through immigration, the large numbers of entering immigrants were faced with the IT downturn.

Appendix

Table A.1
Sample size by entering cohort and immigrant class

Entering cohort	Comparison group[1]	All immigrants	Skilled principal applicants			Spouses and dependents in the skilled class	Family classes	Refugees	Others
			All	Information technology engineers	Others				
	number of observations								
Men									
1991	1,149,630	6,950	2,340	285	2,055	330	2,060	1,585	635
1992	1,153,735	7,710	1,990	263	1,727	260	2,025	1,405	2,030
1993	1,161,080	7,600	1,590	331	1,259	205	2,155	1,255	2,395
1994	1,168,260	6,595	1,920	588	1,332	320	2,575	755	1,025
1995	1,179,390	5,605	2,160	718	1,442	400	2,145	620	280
1996	1,185,890	5,900	2,535	960	1,575	435	1,735	920	275
1997	1,199,540	6,435	3,035	1,241	1,794	470	1,640	870	420
1998	1,204,850	6,745	3,615	1,618	1,997	545	1,505	805	275
1999	1,224,165	5,610	3,075	1,488	1,587	415	1,225	740	155
2000	1,240,115	7,130	4,075	2,187	1,888	560	1,515	860	120
2001	1,281,855	8,850	5,360	2,935	2,425	690	1,655	1,010	135
2002	1,279,960	9,510	5,885	3,128	2,757	810	1,735	970	110
2003	1,294,985	8,435	5,035	2,519	2,516	770	1,670	815	145
2004	1,314,765	8,020	4,020	2,121	1,899	725	1,845	945	485
2005	1,339,080	7,865	3,745	1,680	2,065	825	1,540	570	1,185
Women									
1991	971,515	4,865	700	19	681	1,010	1,765	655	735
1992	984,190	5,530	1,075	26	1,049	745	1,675	590	1,445
1993	993,485	5,580	810	41	769	570	1,975	435	1,790
1994	1,002,600	5,865	805	89	716	685	2,270	310	1,795
1995	1,019,730	4,520	755	90	665	885	1,630	255	995
1996	1,032,475	4,135	850	112	738	925	1,320	345	695
1997	1,052,750	4,215	945	141	804	1,010	1,240	400	620
1998	1,071,030	4,540	1,145	208	937	1,290	1,350	345	410
1999	1,100,575	4,045	995	246	749	1,155	1,115	370	410
2000	1,131,500	5,115	1,190	381	809	1,635	1,465	445	380
2001	1,174,940	6,250	1,560	547	1,013	2,225	1,635	475	355
2002	1,184,610	6,835	1,765	607	1,158	2,605	1,640	475	350
2003	1,209,870	6,070	1,515	438	1,077	2,155	1,645	465	290
2004	1,233,565	6,195	1,275	427	848	1,765	1,895	575	685
2005	1,258,860	6,335	1,415	332	1,083	1,765	1,630	325	1,200

1. Canadian born plus immigrants in Canada for more than 10 years.
Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

Table A.2
Regression coefficients for Table 1 showing the impact of changing immigrant characteristics

Variables	Men			Women		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	coefficient					
Intercept	9.53 ***	9.86 ***	10.63 ***	8.98 ***	9.49 ***	9.79 ***
1991 cohort	-0.09 ***	0.04	0.03	0.15 ***	0.32 ***	0.24 ***
1992 cohort	-0.15 ***	0.00	0.02	0.12 ***	0.23 ***	0.18 ***
1993 cohort	-0.10 ***	0.06 *	0.05 *	0.10 ***	0.22 ***	0.15 ***
1994 cohort	-0.05 *	0.07 **	0.05 *	0.13 ***	0.24 ***	0.15 ***
1995 cohort	0.00	0.07 **	0.06 **	0.08 **	0.19 ***	0.11 ***
1996 cohort	0.05 *	0.11 ***	0.10 ***	0.10 ***	0.20 ***	0.13 ***
1997 cohort	0.05 *	0.09 ***	0.10 ***	0.08 **	0.17 ***	0.13 ***
1998 cohort	0.13 ***	0.14 ***	0.15 ***	0.09 **	0.16 ***	0.12 ***
1999 cohort	0.18 ***	0.18 ***	0.18 ***	0.18 ***	0.24 ***	0.21 ***
2000 cohort	0.21 ***	0.20 ***	0.18 ***	0.15 ***	0.21 ***	0.17 ***
2001 cohort	0.16 ***	0.13 ***	0.13 ***	0.07 *	0.11 ***	0.09 **
2002 cohort	-0.04	-0.07 **	-0.06 *	-0.02	0.02	0.00
2003 cohort	-0.08 **	-0.11 ***	-0.10 ***	-0.05	-0.01	-0.03
2004 cohort	-0.12 ***	-0.12 ***	-0.10 ***	-0.09 ***	-0.04 *	-0.06 **
Years since migration	0.23 ***	0.23 ***	0.23 ***	0.22 ***	0.23 ***	0.25 ***
Years since migration squared	-0.01 ***	-0.01 ***	-0.01 ***	-0.01 ***	-0.01 ***	-0.01 ***
Cohort multiplied by years since migration						
1991 cohort	-0.08 ***	-0.08 ***	-0.09 ***	-0.10 ***	-0.10 ***	-0.11 ***
1992 cohort	-0.08 ***	-0.08 ***	-0.09 ***	-0.10 ***	-0.09 ***	-0.10 ***
1993 cohort	-0.09 ***	-0.09 ***	-0.09 ***	-0.09 ***	-0.09 ***	-0.10 ***
1994 cohort	-0.08 ***	-0.08 ***	-0.09 ***	-0.10 ***	-0.09 ***	-0.10 ***
1995 cohort	-0.08 ***	-0.08 ***	-0.08 ***	-0.09 ***	-0.08 ***	-0.10 ***
1996 cohort	-0.09 ***	-0.08 ***	-0.09 ***	-0.09 ***	-0.08 ***	-0.09 ***
1997 cohort	-0.09 ***	-0.09 ***	-0.09 ***	-0.09 ***	-0.08 ***	-0.09 ***
1998 cohort	-0.10 ***	-0.09 ***	-0.10 ***	-0.09 ***	-0.09 ***	-0.10 ***
1999 cohort	-0.11 ***	-0.10 ***	-0.11 ***	-0.10 ***	-0.10 ***	-0.11 ***
2000 cohort	-0.11 ***	-0.11 ***	-0.11 ***	-0.09 ***	-0.09 ***	-0.10 ***
2001 cohort	-0.10 ***	-0.10 ***	-0.11 ***	-0.08 ***	-0.08 ***	-0.09 ***
2002 cohort	-0.06 ***	-0.06 ***	-0.07 ***	-0.07 **	-0.07 **	-0.07 ***
2003 cohort	-0.04 *	-0.04 *	-0.04 *	-0.05 *	-0.05 *	-0.06 *
Less than 10 years of schooling	...	-0.49 ***	-0.29 ***	...	-0.58 ***	-0.33 ***
10 to 12 years of schooling	...	-0.41 ***	-0.28 ***	...	-0.49 ***	-0.36 ***
Some postsecondary	...	-0.28 ***	-0.24 ***	...	-0.36 ***	-0.30 ***
University	...	-0.16 ***	-0.17 ***	...	-0.16 ***	-0.16 ***
Family class	...	-0.14 ***	-0.10 ***	...	-0.37 ***	-0.20 ***
Skilled spouses and dependents	...	-0.24 ***	-0.12 ***	...	-0.40 ***	-0.17 ***
Refugees	...	-0.40 ***	-0.32 ***	...	-0.51 ***	-0.30 ***
Other classes	...	-0.22 ***	-0.14 ***	...	-0.10 ***	-0.03 ***
Single	...	...	-0.21 ***	...	...	0.26 ***
Lone parent	...	...	-0.17 ***	...	...	0.01 *
Attached, no children	...	...	0.01 *	...	...	0.26 ***

See notes and source at the end of the table.

Table A.2 (concluded)
Regression coefficients for Table 1 showing the impact of changing immigrant characteristics

	Men			Women		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
			coefficient			
Newfoundland and Labrador	...	...	0.34 ***	...	...	0.23 ***
Prince Edward Island	...	...	-0.11	...	...	-0.16 *
Nova Scotia	...	...	-0.13 ***	...	...	-0.18 ***
New Brunswick	...	...	0.03	...	...	-0.25 ***
Quebec (not Montréal)	...	...	-0.37 ***	...	...	-0.36 ***
Ontario (not Toronto)	...	...	0.12 ***	...	...	0.01
Manitoba	...	...	0.09 ***	...	...	0.03 *
Saskatchewan	...	...	0.15 ***	...	...	0.03
Alberta	...	...	0.18 ***	...	...	0.02 **
British Columbia (not Vancouver)	...	...	-0.02 **	...	...	-0.08 ***
Others or missing	...	...	0.08 **	...	...	0.12 ***
Montréal	...	...	-0.30 ***	...	...	-0.28 ***
Toronto	...	...	0.13 ***	...	...	0.10 ***
Years of foreign experience	...	...	-0.01 ***	...	...	0.01 ***
Years of foreign experience squared	...	...	0.00 ***	...	...	0.00 ***
Non English/French	...	...	-0.12 ***	...	...	-0.18 ***
United States	...	...	0.04 ***	...	...	0.12 ***
Caribbean, Central/South America	...	...	-0.34 ***	...	...	-0.15 ***
Eastern Europe	...	...	-0.31 ***	...	...	-0.09 ***
Africa	...	...	-0.46 ***	...	...	-0.20 ***
South Asia	...	...	-0.49 ***	...	...	-0.29 ***
East Asia	...	...	-0.69 ***	...	...	-0.25 ***
Other Asian countries	...	...	-0.47 ***	...	...	-0.11 ***
Other countries	...	...	-0.12 ***	...	...	0.07 ***
Other professionals	...	...	-0.25 ***	...	...	-0.31 ***
Skilled trade	...	...	-0.25 ***	...	...	-0.44 ***
Sales, services	...	...	-0.36 ***	...	...	-0.43 ***
Other occupations	...	...	-0.31 ***	...	...	-0.48 ***
Engineers	...	...	-0.24 ***	...	...	-0.29 ***

* significant at p<0.05
** significant at p<0.01
*** significant at p<0.001

Note: The reference group is 2005 entering cohort for cohort, master's or doctorate degree for education, skilled class principal applicants for immigration class, married with children for family structure, Vancouver for place of residence, English or French for language, Northern/Western/Southern Europe for source region, information technology professionals for occupation.

Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

Table A.3

Foreign work experience, admission class, and source regions of entering male immigrants, 1991, 2000 and 2004, by earnings[1] quartile

	Distribution			Changes in distribution	
	1991	2000	2004	1991 to 2000	2000 to 2004
			years		
Bottom quartile					
Foreign experience	14.7	13.8	13.9	-0.9	0.1
			percent		
Admission class					
Family class	23	19.6	17.1	-3.4	-2.4
Skilled principal applicants	40.4	50.9	51.2	10.6	0.2
Skilled spouse/dependants	9.2	10.6	12.4	1.3	1.9
Refugees	20.6	17.9	15.4	-2.8	-2.5
Others	6.8	1.1	3.9	-5.7	2.9
Source region					
United States	0.7	1.2	0.7	0.4	-0.5
Caribbean, South and Central America	6.1	5.3	6.7	-0.8	1.4
Northern, Western and Southern Europe	3.3	4.5	4.4	1.2	-0.2
Eastern Europe	13.4	13.2	10.1	-0.2	-3.0
Africa	10.8	11.9	15.1	1.1	3.2
South Asia	24.9	20.7	18.7	-4.3	-2.0
East Asia	24.8	29.0	31.0	4.2	2.0
Other Asia	15.4	13.9	12.9	-1.5	-1.0
Other countries	0.5	0.4	0.4	-0.1	0.1
			years		
2nd quartile					
Foreign experience	14.6	14.2	14.2	-0.4	0.0
			percent		
Admission class					
Family class	30.8	29.6	24.8	-1.1	-4.8
Skilled principal applicants	38.3	45.3	46.2	7.0	0.9
Skilled spouse/dependants	7.2	7.7	9.2	0.6	1.5
Refugees	15.8	14.8	13.1	-1.1	-1.7
Others	7.9	2.5	6.6	-5.4	4.1
Source region					
United States	0.7	0.9	1.0	0.2	0.1
Caribbean, South and Central America	8.9	8.4	7.6	-0.5	-0.8
Northern, Western and Southern Europe	4.5	6.2	5.0	1.7	-1.2
Eastern Europe	11.7	13.0	11.7	1.3	-1.3
Africa	7.3	9.7	12.5	2.3	2.8
South Asia	26.5	23.6	23.6	-2.9	0.0
East Asia	21.7	20.5	21.4	-1.2	0.9
Other Asia	17.9	17.0	16.4	-0.9	-0.6
Other countries	0.8	0.8	0.8	0.0	0.0

See the note and source at the end of the table.

Table A.3 (concluded)

Foreign work experience, admission class, and source regions of entering male immigrants, 1991, 2000 and 2004, by earnings[1] quartile

	Distribution			Changes in distribution	
	1991	2000	2004	1991 to 2000	2000 to 2004
			years		
3rd quartile					
Foreign experience	15.0	13.5	13.6	-1.4	0.1
			percent		
Admission class					
Family class	29.7	25.6	26.6	-4.0	0.9
Skilled principal applicants	42.8	50.3	45.8	7.6	-4.6
Skilled spouse/dependants	7.3	7.8	9.0	0.5	1.1
Refugees	12.9	13.6	11.4	0.6	-2.1
Others	7.3	2.7	7.3	-4.7	4.6
Source region					
United States	1.0	1.3	1.3	0.3	-0.1
Caribbean, South and Central America	9.7	7.9	7.9	-1.8	0.0
Northern, Western and Southern Europe	6.9	8.1	6.4	1.2	-1.7
Eastern Europe	12.3	14.4	12.4	2.1	-2.0
Africa	7.1	8.9	10.4	1.8	1.4
South Asia	23.7	24.4	27.3	0.8	2.9
East Asia	17.4	17.1	14.7	-0.3	-2.4
Other Asia	21.1	16.7	18.2	-4.4	1.5
			years		
Top quartile					
Foreign experience	13.7	11.6	12.6	-2.1	1.0
			percent		
Admission class					
Family class	15.8	10.7	22.1	-5.1	11.4
Skilled principal applicants	68.9	80.2	58.4	11.3	-21.8
Skilled spouse/dependants	5.9	5.1	5.6	-0.8	0.5
Refugees	5.7	3.4	7.4	-2.2	4.0
Others	3.7	0.6	6.5	-3.1	5.9
Source region					
United States	4.4	2.8	3.9	-1.6	1.1
Caribbean, South and Central America	6.4	6.2	9.1	-0.1	2.8
Northern, Western and Southern Europe	15.3	14.8	16.4	-0.5	1.6
Eastern Europe	17.7	17.8	12.7	0.1	-5.1
Africa	9.3	9.3	11.1	0.0	1.8
South Asia	19.1	16.4	21.6	-2.8	5.2
East Asia	15.2	23.7	9.7	8.5	-14.0
Other Asia	11.3	7.9	12.5	-3.3	4.5
Other countries	1.3	1.1	3.1	-0.2	2.0

1. Earnings during first two full years in Canada.

Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

Table A.4
Foreign work experience, admission class, and source regions of entering female immigrants, 1991, 2000 and 2004, by earnings[1] quartile

	Distribution			Changes in distribution	
	1991	2000	2004	1991 to 2000	2000 to 2004
			years		
Bottom quartile					
Foreign experience	15.3	13.8	13.5	-1.5	-0.3
			percent		
Admission class					
Family class	37.3	28.5	31.0	-8.8	2.5
Skilled principal applicants	8.6	14.9	15.9	6.4	0.9
Skilled spouse/dependants	24.5	39.5	36.8	15.0	-2.7
Refugees	20.0	13.5	11.7	-6.5	-1.8
Others	9.6	3.5	4.6	-6.1	1.1
Source region					
United States	2.1	0.9	1.5	-1.2	0.6
Caribbean, South and Central America	14.4	6.5	8.9	-7.9	2.3
Northern, Western and Southern Europe	9.1	4.5	3.8	-4.6	-0.7
Eastern Europe	22.2	18.0	13.5	-4.2	-4.5
Africa	7.0	8.2	9.8	1.2	1.5
South Asia	8.7	15.5	18.9	6.9	3.4
East Asia	13.3	32.1	31.0	18.8	-1.2
Other Asia	22.0	13.6	12.0	-8.4	-1.6
Other countries	1.2	0.5	0.6	-0.7	0.1
			years		
2nd quartile					
Years of foreign experience	15.3	14.1	14.0	-1.3	-0.1
			percent		
Admission class					
Family class	41.0	35.1	36.6	-5.9	1.4
Skilled principal applicants	10.7	15.3	16.0	4.6	0.7
Skilled spouse/dependants	20.6	33.2	29.0	12.6	-4.2
Refugees	16.1	10.7	9.9	-5.3	-0.8
Others	11.7	5.6	8.5	-6.1	3.0
Source region					
United States	1.8	1.3	1.3	-0.6	0.0
Caribbean, South and Central America	14.2	7.2	8.2	-7.0	1.0
Northern, Western and Southern Europe	10.4	4.4	4.4	-6.0	0.0
Eastern Europe	18.7	16.4	12.8	-2.3	-3.6
Africa	5.6	6.3	8.9	0.6	2.6
South Asia	10.3	19.9	21.4	9.6	1.4
East Asia	12.5	28.6	26.9	16.1	-1.7
Other Asia	25.0	15.5	15.4	-9.5	-0.1
Other countries	1.4	0.5	0.8	-0.9	0.3

See the note and source at the end of the table.

Table A.4 (concluded)

Foreign work experience, admission class, and source regions of entering female immigrants, 1991, 2000 and 2004, by earnings[1] quartile

	Distribution			Changes in distribution	
	1991	2000	2004	1991 to 2000	2000 to 2004
			years		
3rd quartile					
Foreign experience	15.6	14.4	14.1	-1.2	-0.3
			percent		
Admission class					
Family class	38.3	29.6	30.3	-8.6	0.6
Skilled principal applicants	11.3	19.2	17.2	7.8	-2.0
Skilled spouse/dependants	21.2	28.9	28.3	7.7	-0.6
Refugees	11.7	8.7	8.8	-3.0	0.2
Others	17.5	13.6	15.4	-4.0	1.8
Source region					
United States	1.4	1.3	1.8	0.0	0.5
Caribbean, South and Central America	14.1	8.8	9.0	-5.3	0.3
Northern, Western and Southern Europe	11.4	6.4	4.4	-5.0	-2.0
Eastern Europe	13.8	13.1	12.5	-0.7	-0.5
Africa	3.8	5.5	8.2	1.7	2.7
South Asia	7.7	16.1	18.2	8.4	2.0
East Asia	14.0	25.2	21.4	11.1	-3.7
Other Asia	32.8	22.8	23.1	-10.0	0.3
Other countries	1.1	0.8	1.3	-0.3	0.4
			years		
Top quartile					
Foreign experience	13.8	10.9	12.2	-2.9	1.3
			percent		
Admission class					
Family class	29.2	21.6	22.4	-7.6	0.8
Skilled principal applicants	25.1	41.7	35.3	16.6	-6.4
Skilled spouse/dependants	18.8	26.4	20.1	7.6	-6.3
Refugees	6.8	3.8	6.9	-3.0	3.2
Others	20.2	6.6	15.4	-13.6	8.8
Source region					
United States	4.7	4.5	5.2	-0.2	0.8
Caribbean, South and Central America	12.9	7.5	8.4	-5.5	0.9
Northern, Western and Southern Europe	14.6	11.6	11.2	-3.0	-0.4
Eastern Europe	10.0	13.8	11.4	3.8	-2.4
Africa	5.8	7.7	9.9	1.9	2.2
South Asia	5.1	10.6	10.5	5.5	-0.1
East Asia	15.3	26.9	15.9	11.6	-11.0
Other Asia	30.7	15.8	24.7	-14.9	8.9
Other countries	0.8	1.6	2.7	0.7	1.1

1. Earnings during the first two full years in Canada.

Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

Table A.5
Change in entry earnings[1] between 1991 and 2000 entering cohorts associated with changes in education and immigrant class distributions

Selected points in the earnings distribution	Change in entry earnings, 1991 to 2001 entering cohorts	
	Using 1991 as base year	Using 2000 as base year
	percent	
Women		
At 15th percentile	1	3
At 50th percentile	8	7
At 90th percentile	20	13
Men		
At 15th percentile	0	7
At 50th percentile	10	9
At 90th percentile	24	23

1. Earnings during the first two full years in Canada.

Note: The DiNardo, Fortin and Lemieux (1996) technique was used to calculate the counterfactual earnings distributions needed to estimate the change in entry earnings between the 1991 and 2000 entering cohorts.

Source: Statistics Canada, Longitudinal Administrative Databank and Longitudinal Immigration Database.

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